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**Plants Growing in Trees.**—A long list might be made of the plants that domesticate themselves in trees. The elms of New Haven, Connecticut, furnish some interesting examples: currant bushes bearing fruit occur in many places, as on Hillhouse Avenue and the College grounds. A matrimony-vine (*Lycium vulgare*), flourishes in one of the huge trees in front of the Scientific School. I have seen gooseberry bushes in similar situations. Grass often figures as an air-plant, and a hollow in a trunk, some fifteen feet from the ground, is filled with a beautiful growth of ferns. I refrain from giving the specific locality for fear the progressive aldermen may cut the tree down.

Brick Church, N. J.

HENRY BALDWIN.

### Botanical Notes.

*The Distribution of Ferns in the United States.* In a paper upon this subject in the *Proceedings* of the American Philosophical Society (Feb. 2, 1883, p. 610), Mr. George E. Davenport says:

So far as now known, New York, Michigan, Florida, Vermont and California, in the order named, have the greatest number of species of ferns within their respective limits.

In the first, second and fourth of these States, the number has, in all probability, reached, or very nearly reached, its maximum, while in the third and fifth it is likely to be largely increased, and those States, from their favorable situations, climate, and comparatively extensive, unexplored territory, will undoubtedly lead all other States in the future, Arizona and Texas alone being at all likely to compete with them for the highest place.

If, however, we distribute our ferns according to the number of square miles of territory which each of the five first-named States contains, then Vermont will lead the others, her ratio being as 1 to every  $226\frac{2}{3}$  square miles, that for New York as 1 to 814, Michigan 1 to 1,191 $\frac{1}{2}$ , Florida, 1 to 1,289, and California 1 to 4,295 $\frac{1}{2}$  square miles of territory.

Taking the extremes of the territorial limits, excluding the District of Columbia, which has 1 species to each  $2\frac{1}{2}$  miles of territory, Rhode Island gives us 1 species for each  $38\frac{1}{4}$ , and Delaware 1 to 75, as compared with Pennsylvania's 1 to 109 $\frac{1}{4}$ , Colorado's 1 to 4,200 and Texas's 1 to 7,878 $\frac{3}{8}$ , square miles.

If we take an average of the fern-flora for the different geographical sections of the United States, on the basis of the present list, New England gives us an average of 40 species for each State, the Middle Atlantic States 40, the South Atlantic 27, the Gulf States 27, the Central States 25, the Pacific States 23, and the Territories an average of 19.

The returns from most of the Territories are altogether too meagre at present to permit of any comparisons, and those already made will necessarily undergo considerable modification as the gaps in the lists for other States fill up.

But, while no absolutely reliable comparisons can be made, nor the precise limits of each species be determined from the present incomplete tables, we may ascertain from them with a tolerable degree of

certainly the range of certain species, and find material for some interesting observations.

Thus, we find the cosmopolitan *Asplenium trichomanes* and *Pteris aquilina* in thirty-five and thirty-nine out of the forty-eight States and Territories respectively, while their actual presence in a greater number may be safely assumed. *Polypodium vulgare* appears in thirty-three, with the same, or an even greater probability of its occurring in others in its favor, while its near congeners, *P. Californicum*, and *P. falcatum*, as well as *P. Scouleri*, are restricted to two or three States. Of the remaining Polypodiums, all but *incanum*, which appears in twelve States, are restricted to the single State of Florida, which furthermore monopolizes all the species we have in six genera, the tropical character of these being at once indicated by this fact.

The only other State (since the discovery of *Scolopendrium* in Tennessee has divided with New York the honor of that fern's presence) which may now claim a monopoly of a genus is New Jersey, the very local *Schizaea* being restricted to a portion of its limits, and again restricted to a single species.

*Adiantum pedatum* occurs in thirty-five States or Territories, while its congener, *A. Capillus-Veneris*, is restricted to thirteen, and the tropical *A. tenerum* to a single State.

The Osmundas are represented by one or more species in twenty-nine, *Onoclea* in twenty-eight States or Territories, and these probably occur in more, although not reported west of the Rocky Mountains. *O. sensibilis* extends as far west as Dakota and Montana, and, in the last-mentioned Territory, is said to have been discovered in a fossil state.

*Cystopteris fragilis* extends from Maine to California, through thirty-three States and Territories, apparently avoiding the South Atlantic and Gulf States, with the exception of North Carolina, while *C. bulbifera* occurs in twenty-five, covering a more unequal, but broader range south and west, the limits of which terminate in Louisiana and Dakota. *C. montana*, so recently discovered in Colorado by Brandegee, is reported elsewhere in the United States only from Alaska. The Aspidia are represented in forty-four, the Asplenias and Bortrychia in forty-one States or Territories each, while the drought-resisting Gymnogrammes, Notholænas, Cheilanthes and Pellæas are almost wholly restricted to the arid regions west of the Rocky Mountains, a few scattering species only coming east, north, or south.

It is interesting to note the changes which have taken place in the number and distribution of our ferns since Redfield published his valuable paper on the "Geographical Distribution of the Ferns of North America," in the TORREY CLUB BULLETIN for January, 1875, and Mr. Watt his admirable review of Mrs. Lyell's Hand-Book in the *Canadian Naturalist* for 1870. Mr. Redfield enumerated 125 species, which have been increased up to the present time to 153 or 156, according as we may consider the claims of certain ferns to specific rank, or their right to a place in our fern-flora, while the range of the older species has been more or less extended.

Taking the number in the list accompanying this paper for a base, viz., 155, we have since 1875 an increase of 30 species.